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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,891

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Mitsuaki Hata

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT

PAPER NUMBER

1715

NOTIFICATION DATE

DELIVERY MODE

09/02/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/550,891	Applicant(s) HATA, MITSUAKI	
	Examiner Kirsten C. Jolley	Art Unit 1715	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-24 is/are pending in the application.
- 4a) Of the above claim(s) 20-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/31/10</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 28, 2010 has been entered.

Election/Restrictions

2. Newly submitted claims 20-24 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 1-6 and 8-19, and claims 20-24, are directed to different classes of invention. Namely, claims 1-6 and 8-19 are directed to a method of manufacturing a mask blank, whereas new claims 20-24 are directed to a mask blank product or transfer mask product. Additionally, there is a lack of unity of invention “*a posteriori*.” See MPEP 1850. The “special technical feature” common to both sets of claims is a mask blank having a resist film thereon where the difference between a maximum thickness and a minimum thickness of the resist film is 50 angstroms or less. This technical feature does not make a “contribution” over the prior art as illustrated by U.S. Patent No. 7,238,454 to Kobayashi et al., which teaches the production of a mask blank having a resist film, wherein an unnecessary part of the resist film is removed at the periphery of the substrate, and wherein a

Art Unit: 1715

difference between a maximum thickness and a minimum thickness of the resist film is 50 angstroms or less (col. 13, lines 44-46).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 20-24 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Arguments

3. Applicant's arguments filed June 28, 2010 have been fully considered but they are not persuasive. Applicant argues that in the case where the unnecessary-film-removing process of Hata is applied, the uniformity of the film thickness is deteriorated in the unnecessary-film-removing process and the in-plane-film thickness uniformity exceeds 100 Angstroms. The Examiner notes that this is the results for Hata alone. Applicant further argues that Kitano et al. does not teach that the reduced-pressure-drying process is performed in order to solve the above problem. However, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant argues that Kitano et al. describes its combination of a single-stroke technique and a reduced-pressure drying process independent of the spin coating method, and that Kitano et al. recognizes that non-uniformity in film thickness is caused by the spin coating method. While Kitano et al. may teach away from a spin coating process in its background section (col. 1,

Art Unit: 1715

lines 55-58), the reference none-the-less provides a clear teaching in col. 25, lines 61-67 that the resist solution in its reduced-pressure drying process may be applied by a spin coating method instead of a single stroke method. Applicant further argues that Kitano et al. merely describes (1) a method combining the single-stroke technique and the reduced-pressure drying process, (2) a method combining the single-stroke technique using the film forming apparatus and the reduced-pressure drying process, and (3) a spin coating method using the film forming apparatus. The Examiner disagrees because the “reduced-pressure drying section” is part of the resist “coating unit” – see claim 1 as evidence of this.

Applicant argues that even if Hata and Kitano et al. are combined, neither Hata nor Kitano et al. has a knowledge of the flow of the resist caused by using a covering member in the unnecessary-film-removing process, therefore even a combination of the references would not teach or suggest the present invention such that a difference in thickness is suppressed to 50 angstroms or less even if the unnecessary-film-removing process is performed. The Examiner maintains the position that the difference in thickness of the resist film must necessarily be limited to 50 angstroms or less, similar to Applicant's, because the claimed process and that of the combined references of Hata in view of Kitano et al. have similar materials and process steps.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1715

2. Claims 1-2, 4-6, 8-9, and 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata (US 2002/0000424) in view of Kitano et al. (US 6,676,757).

Hata discloses a method for manufacturing a mask blank by depositing a film of resist liquid on a substrate by a spin coating process, and thereafter covering the surface of the substrate with a covering member and performing removal by dissolving an unnecessary part of the resist film by supplying a solvent from above the covering member during the rotation of the substrate and the covering member together so that the solvent is supplied to the periphery of the substrate. It is well known in the spin coating art that in the process of performing spinning to spread the coating to the outer periphery of the substrate, some drying of the applied liquid also occurs ("spin-drying"). Hata lacks a teaching of performing a reduced-pressure drying process for the spin-coated resist film prior to performing the unnecessary-film-removing process.

Kitano et al. similarly discloses a process for applying a resist film to a substrate and subsequently performing a coating film edge removal process at the outer periphery of the substrate (col. 11 and col. 12, lines 20-38). Kitano et al. also teaches the use of a reduced-pressure drying process, after coating of the resist film on the substrate and before the coating film edge removal (col. 11, line 62 to col. 12, line 19). Kitano et al. teaches that improved results are achieved when using reduced pressure drying as opposed to drying on a heating plate, which is conventionally performed after a spin coating process and before edge removal. Kitano et al. teaches that a reduced pressure drying process can be performed quickly and a temperature of the coating film can be maintained uniform, as well as uniformity of film thickness is maintained since reduced pressure drying eliminates variations in the amount of volatilization in the film (col. 2, lines 14-35 and col. 3, lines 4-18). Further, Kitano et al. teaches that its reduced-

Art Unit: 1715

pressure-drying process may be used in combination with a spin coating process (col. 25, lines 61-67). It would have been obvious to one having ordinary skill in the art, having seen the references of Hata and Kitano et al. in combination, to have performed a reduced pressure drying process in the method of Hata prior to performed the edge unnecessary-film-removing process with the expectation of increased efficiency in the process and increased uniformity of coating thickness and temperature of the film. The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges*, 783 F.2d 1038. Additionally, *KSR* forecloses the argument that a **specific** teaching, suggestion, or motivation is required to support a finding of obviousness. See the recent Board decision *Ex parte Smith*, --USPQ2d--, slip op. at 20, (Bd. Pat. App. & Interf. June 25, 2007) (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d at 1396) (available at <http://www.uspto.gov/web/offices/dcom/bpai/prec/fd071925.pdf>).

As to the newly added limitation to independent claims 1 and 19 requiring a difference between a maximum thickness and minimum thickness of the resist film is 50 angstroms or less, the Examiner notes that the difference in thickness in the combined process of Hata in view of Kitano et al. would necessarily be 50 angstroms or less after removing the peripheral resist film because the claimed process and that of Hata in view of Kitano et al. have similar materials and process steps. Similarly, with respect to claims 18-19, while not specifically disclosed by the references, the combined process of Hata in view of Kitano et al. would necessarily result in the suppression of the flow of the resist film from the central part of the substrate toward the

Art Unit: 1715

periphery of the substrate by the temperature distribution in the unnecessary-film-removing process so that a deterioration in an in-plane-film thickness uniformity of the resist film caused by the unnecessary-film-removing process is suppressed because the claimed process and that of Hata in view of Kitano et al. have similar materials and process steps.

As to claim 2, Hata discloses the spin coating process in paragraph [0003]. While Hata does not specifically teach use of a cup having an opening on an upside, the Examiner takes Official notice that such a configuration for a spin coating cup is very well known in the spin coating art. It would have been obvious for one having ordinary skill in the art to have used an apparatus having an upper opening in the absence of a showing of criticality.

As to claim 4, Kitano et al. teaches use of a suction pipe 42b and suction pump 42c located at the topside of the cup in Figure 5. However it is the Examiner's position that it would have been obvious to an engineer having ordinary skill in the art to have alternatively placed the pump and pipe at the downside of the cup with the expectation of similar results, as a matter of design preference, in the absence of a showing of criticality.

As to claim 5, it is the Examiner's position that the degree of vacuum is stepwise decreased in the process of Kitano et al. since the vacuum is turned on once the substrate is inside the container (col. 11, line 62 to col. 12, line 19). As to claim 9, it is noted that the substrate is stationary when the reduced pressure drying is performed.

It is noted that the process of Hata in view of Kitano et al. would produce a uniform film as claimed in claim 8.

As to claim 11, Hata teaches that a baking process is performed after the edge removal in paragraph [0078].

Art Unit: 1715

As to claims 12 and 15, Kitano et al. teaches that the drying performed in a spin coating process (“spin-drying”) results in about 90% drying. Such would necessarily result in the resist film formed at the periphery not having fluidity. As to claims 13 and 16, Kitano et al. teaches that reduced-pressure-drying dries the resist film to an extent not to flow by a temperature distribution in col. 13, lines 11-20.

As to claims 14 and 17, the substrate in Hata is quadrangular as illustrated in the figures.

3. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata in view of Kitano et al. as applied to claims 1 and 6 above, and further in view of Okada (US 4,748,053).

Hata in view of Kitano et al. are applied as discussed above in section 3. The references lack a teaching of first applying the resist liquid at a first speed, and then spinning at a second, lower speed in the spin coating process. Okada is directed to a method of applying a resist film on a square photo mask substrate. Okada teaches that a uniform film is achieved on the square substrate when spreading of the resist occurs by rotating at a first speed, followed by drying during the spreading step by rotating the substrate at a second speed slower than the first speed (abstract and col. 2, lines 11-26). It would have been obvious for one having ordinary skill in the art to have performed the spin coating/drying process at two separate speeds, a first higher speed followed by a second lower speed as taught by Okada, in the process of Hata in view of Kitano et al. with the expectation of improved uniformity of the resist liquid coating since Hata is similarly directed to application of a resist film on a square photomask substrate.

Art Unit: 1715

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Tuesday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kirsten C Jolley/
Primary Examiner, Art Unit 1715

kcj